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10. (New) The security thread of claim 9, wherein the plurality of horizontal dipoles comprise unpoled regions and the plurality of vertical dipoles comprise poled regions.

11. (New) A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer and wherein the security thread further comprises a metallisation layer between the piezoelectric polymer layer and the magnetic layer, the metallisation layer having formed thereon characters readable in response to a stimulus for authentication.

REMARKS

Reconsideration of this application is requested. Claims 1-6 were pending. Claims 1-5 stand rejected. Claim 6 stands objected to. By this amendment, Claim 3 has been amended to correct a typographical omission, claim 6 has been amended to be of independent form and to recite limitations found in claims 1, 5 and original claim 6. Claims 7-11 are newly added herein. No new mater has been added.

§103 Rejections

Claims 1 and 3-5 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kaule et al. (U.S. Pat. No. 5,509,691) in view of Chen (U.S. Pat. No. 4,792,667). For the reasons set forth below, this ground of rejection is respectfully traversed.

The present invention comprises a security thread 2 which may be embedded into, for example, security documents and banknotes. The security thread 2 includes a magnetic layer 4 sandwiched between metal layers 11 and 14. Polymeric layers 6 and 8 are disposed on the metal layers 14, 11, respectively. At least one of the polymeric layers (e.g., layer 8) preferably comprises a piezoelectric material capable of storing a charge, or series of charges. The charge

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or series of charges may be read by a suitable device in order to determine if the security document or banknote in which the security thread 2 is embedded is authentic.

In one embodiment, the series of charges may comprise a series of poled (i.e., charged with a positive or negative charge) and unpoled (i.e., uncharged) regions, thereby providing a binary code. In another embodiment, the series of charges may comprise a series of positively charged, negatively charged and uncharged regions, thereby providing a tertiary code (See Fig. 3).

Kaule teaches a security element which includes magnetic layers 12, 13, metal layers 10, 11 and polymeric layers 8, 9 (See Fig. 2). Kaule nowhere discloses or suggests a piezoelectric polymeric layer capable of retaining a charge or series of charges. In fact, the Examiner admits the same at page 3 of the Office Action. The Examiner relies on Chen for the teaching of providing a charged piezoelectric polymeric layer. However, as explained below, the teachings of Chen are not properly combinable with the teachings of Kaule, and in any event do not yield the claimed invention.

Chen discloses an identification card 1 which includes a substrate 7, a photograph 3, and a polymeric material 5 disposed over the photograph. The polymeric material 5 may be polarized with an electrical charge so as to provide security for the identification card. For example, if the charged area is subjected to certain temperatures, the charge will be removed, thus indicating that someone has tampered with the identification card.

Independent claim 1 recites:

A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer. [emphasis added].

Thus, claim 1 requires a "security thread" which includes a magnetic layer and at least one layer of "piezoelectric" polymer. Kaule teaches a security thread, however, it does not include a piezoelectric polymer layer. Chen fails to teach either a security thread or a magnetic layer, but teaches a charged piezoelectric polymer layer in a photo identification card. The

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combination of Kaule and Chen is ineffective to render the invention recited in claim 1 obvious, as explained below.

First, the use of hindsight in reconstructing the claimed invention based on Applicant's own disclosure is impermissible to render obvious Applicant's claimed invention. More particularly,

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then accepted wisdom in the field. ... Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher. *In re Kotzab*, 217 F.3d 1365. (emphasis added).

Kaule teaches a security thread 2 which may be embedded in a security document or a banknote to assist in determining if the document or banknote is authentic. Chen teaches a tamper resistant identification card 1. In the first instance, these art areas are clearly diverse, and thus the references are not properly combinable in a § 103 rejection. Further, when confronted with the problem of providing a specific authentication pattern in a security thread, one of ordinary skill in the art, looking at the primary reference, would not be motivated to go to the secondary reference. This is because Kaule and Chen teach *alternative* methods of authentication and tamper protection; hence, absent the use of Applicant's disclosure as a blueprint, it would also be illogical to combine them. Therefore, reconsideration and withdrawal of this ground of rejection with respect to independent claim 1, and claims 3-5 dependent thereon, is respectfully requested.

To establish a prima facie case of obviousness, there must be some teaching, suggestion or motivation in the prior art to make the specific change made by the applicant. *In re Dance*, 160 F.3d 1339, 1343 (Fed. Cir. 1998). Obviousness should be measured "at the time the

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invention was made" (i.e. the filing date of the application), and with no prior knowledge of the applicant's disclosure. In re Dembiczak, 175 F.3d 994, 998-999 (Fed. Cir. 1999).

Obviousness cannot be established by hindsight combination to produce the claimed invention. In re Dance, 160 F.3d. at 1343. The Examiner must show reasons why the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the prior art references for combination in the manner claimed. In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Kaule nowhere discloses or suggest the concept of using the security thread 2 to provide tamper protection in an identification card. Similarly, Chen nowhere discloses or suggests utilizing a piezoelectric polymeric layer in a security thread for providing authentication. Accordingly, reconsideration and withdrawal of this ground of rejection with respect to independent claim 1, and claims 3-5 dependent thereon, is respectfully requested.

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being obvious over Kaule et al. in view of Chen, and further in view of Lawandy (U.S. Pat. No. 6,259,506). For the reasons set forth below, this ground of rejection is respectfully traversed.

As explained above with reference to claim 1, neither Kaule nor Chen discloses or suggest a security thread which includes a magnetic layer and a piezoelectric polymer layer. Lawandy similarly fails to disclose or suggest such an invention.

Lawandy teaches a security thread 1 which includes a thread-like material layer 16 and a metal layer 16 which are sandwiched by respective polymer layers 10 and 12. In one embodiment, the security thread includes regions 1a with liquid crystal (LC) elements therein, and regions 1b with no LC elements (See Fig. 2C). As shown in Figure 3A of the patent, the security thread 1 may be inserted into a paper matrix 11 (e.g., monetary instrument) to provide authentication of the instrument. For example, during normal use of the instrument as currency or otherwise, the LC elements in the security thread 1 are not viewable. However, when the instrument including the security thread 1 is coupled to a suitable excitation source (e.g., source

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22 and electrodes 18, 20; Figs. 1A, 1B), the LC elements become viewable, and thus authentication of the instrument is verified.

Lawandy fails to disclose or suggest a security thread which includes a magnetic layer and a piezoelectric polymer layer, as recited in independent claim 1. Further, Lawandy fails to disclose or suggest a security thread "wherein [a] piezoelectric polymer layer has poled and unpoled regions forming a binary or tertiary code", as recited in dependent claim 2. All Lawandy teaches is forming one or more LC elements (1b) in a security thread (See Figs. 2C, 2D and description). Accordingly, for at least these reasons, reconsideration and withdrawal of this ground of rejection with respect to claim 2 is requested.

New claims 7-12 have been added herein to further define Applicant's claimed invention.

Newly added independent claim 8 recites

A security thread comprising:

a magnetic layer sandwiched between first and second metallisation layers;

a first polymeric layer disposed on the first metallisation layer;

and,

a second polymeric layer disposed on the second metallisation layer,

wherein the first polymeric layer is comprised of a piezoelectric material and the second polymeric layer is comprised of a non-piezoelectric flexible plastic material.

Support for this claim may be found on page 3, lines 17-34. Newly added claims 9 and 10 depend from independent claim 8. Allowance of this claim is respectfully requested.

Newly added independent claim 11 recites

A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer and wherein the security thread further comprises a metallisation layer between the piezoelectric polymer layer and the magnetic layer, the metallisation layer having

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formed thereon characters readable in response to a stimulus for authentication.


Support for this claim may be found on page 4, lines 16-25. None of the prior reference of record, either singularly or in combination, disclose or suggest each of the features and limitations as recited in present claim 11. Accordingly, allowance of this claim is respectfully submitted.

In view of the foregoing remarks and amendments, Applicants submit that this application is in condition for allowance at an early date, which action is earnestly solicited.

The Assistant Commissioner for Patents is hereby authorized to charge any fees associated with this Amendment, or credit any excess payment to Deposit Account **50-2061**.

Respectfully submitted,

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Version With Markings to Show Changes Made

Claims

1. (Unchanged) A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer.
2. (Unchanged) The security thread of claim 1 wherein the piezoelectric polymer layer has poled and unpoled regions forming a binary or tertiary code.
3. (Amended) The security thread of claim 1 or 2 wherein a pair of the protective layers, one on either side of the magnetic layer, is a piezoelectric layer.
4. (Unchanged) The security thread of claim 3 wherein each of the piezoelectric layers has poled and unpoled regions.
5. (Unchanged) The security thread of any one of the preceding claims wherein the thread further comprises a metallisation layer between the piezoelectric polymer layer and the magnetic layer.
6. (Amended) A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer and wherein the security thread further comprises a metallisation layer between the piezoelectric polymer layer and the magnetic layer, and further [The security thread of claim 5]wherein the metallisation layer acts as a ground electrode for the piezoelectric layer.
7. (New) The security thread of claim 1, wherein the piezoelectric polymer is capable of receiving a plurality of charges which may be used in authentication of a document in which the security thread is embedded.
8. (New) A security thread comprising:
 - a magnetic layer sandwiched between first and second metallisation layers;
 - a first polymeric layer disposed on the first metallisation layer; and,
 - a second polymeric layer disposed on the second metallisation layer,wherein the first polymeric layer is comprised of a piezoelectric material and the second polymeric layer is comprised of a non-piezoelectric flexible plastic material.
9. (New) The security thread of claim 8, wherein the first polymeric layer includes a plurality of horizontal dipoles and plurality of vertical dipoles.
10. (New) The security thread of claim 9, wherein the plurality of horizontal dipoles comprise unpoled regions and the plurality of vertical dipoles comprise poled regions.

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11. (New) A security thread comprising a magnetic layer sandwiched between protective layers, wherein at least one of the protective layers comprises a piezoelectric polymer and wherein the security thread further comprises a metallisation layer between the piezoelectric polymer layer and the magnetic layer, the metallisation layer having formed thereon characters readable in response to a stimulus for authentication.

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